

Contract No.: B2532538
Technology: Electrical Resistivity
Contractor: D'Appolonia Engineering Division of Ground Technology, Inc.

Summary of technology:

Electrical resistivity is a surface-based geophysical method used to detect underground mine voids by measuring the response of sub-surface materials to induced electrical currents. The method involves deploying arrays of electrodes on the ground surface, inducing electrical current into the ground, and measuring the voltage difference at receiving electrodes. The difference in current and voltage through a block of sub-surface material yields a resistivity which can then be compared to known resistivities to determine the composition of the sub-surface block. Various configurations of electrodes can be used.

Stated limitations of technology:

The effectiveness of electrical resistivity decreases with depth and void size. The effectiveness of the method also decreases if the voids are not water-filled and if the terrain and geology are complicated.

Field demonstration results:

Field Demonstration Conditions	Goal of Demonstration	Results of Demonstration
Flat to hilly terrain. Void size = 5 feet high, 20 feet wide. Void depths = 20 to 60 feet. Voids were air filled and partially water filled. Ground surface of survey line was relatively clear of trees and vegetation.	Locate mine voids filled with air and/or water along the perimeter of an impoundment – useful for assessing impoundment breakthrough potential.	Results varied. Some voids were detected, some were not. Interpretation of results relied heavily on information from the mine map. Laser imaging done by a subcontractor was beneficial in identifying a mine entry that was not shown on the mine maps.